AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

COMPLETE LISTING OF CLAIMS:

Claims 1-20 : (Canceled)

Claim 21 : (New) An x-ray generator comprising:

a vessel for holding a low pressure gas atmosphere inside;

hemimorphic crystal supporting means provided in said vessel;

at least a pair of hemimorphic crystals supported by said hemimorphic crystal supporting means in said vessel and arranged oppositely to each other at a distance therebetween; and

a heating and cooling means for elevating and lowering a temperature of said hemimorphic crystals, wherein

x-rays are radiated from said vessel as the temperature of said hemimorphic crystals is elevated or lowered.

Claim 22 : (New) The x-ray generator according to claim 21, wherein said vessel has walls formed of a material for blocking the x-rays and provided with at least one x-ray transmission window.

Claim 23 : (New) The x-ray generator according to claim 21, wherein said hemimorphic crystals of each pair are arranged oppositely to each other at oppositely charged planes, and wherein said heating and cooling means elevates and lowers the temperature of

said hemimorphic crystals of each pair with the same temperature gradients and with the same periods.

Claim 24 : (New) The x-ray generator according to claim 21, wherein said hemimorphic crystals of each pair are arranged oppositely to each other at oppositely charged planes, and a metal target is arranged between said hemimorphic crystals of each pair and is supported by a target supporting means in said vessel.

Claim 25 : (New) The x-ray generator according to claim 21, wherein said hemimorphic crystals of each pair are arranged oppositely to each other at planes having a charge of the same sign, and wherein said heating and cooling means elevates and lowers the temperature of said hemimorphic crystals of each pair with the same temperature gradients and with the same periods.

Claim 26 : (New) The x-ray generator according to claim 21, wherein said hemimorphic crystals of each pair are arranged oppositely to each other at planes having a charge of the same sign, and wherein said heating and cooling means elevates and lowers the temperature of said hemimorphic crystals of each pair with the opposite temperature gradients and with the same periods.

Claim 27 : (New) An x-ray generator comprising:

a vessel for holding a low pressure gas atmosphere inside;

hemimorphic crystal supporting means arranged in said vessel;

a pair of hemimorphic crystals supported by said hemimorphic crystal supporting means in said vessel and arranged oppositely to each other at a distance therebetween,

said pair of hemimorphic crystals being arranged oppositely to each other at planes having a charge of the same sign;

a metal target surrounding a space between said pair of hemimorphic crystals in said vessel and supported by a target supporting means arranged in said vessel; and

a heating and cooling means for elevating and lowering a temperature of said hemimorphic crystals, wherein

x-rays are radiated from said vessel as the temperature of said hemimorphic crystals is elevated or lowered.

Claim 28 : (New) The x-ray generator according to claim 27, wherein said vessel has walls formed of a material that does not transmit the x-rays and is provided with at least one x-ray transmission window.

Claim 29 : (New) The x-ray generator according to claim 21, wherein said heating and cooling means has a temperature sensor for measuring the respective temperature of said hemimorphic crystals of each pair; a heating and cooling means for repeatedly heating and cooling said hemimorphic crystals; and a control means for controlling operation of said heating and cooling means based on a temperature detection signal from said temperature sensor.

Claim 30 : (New) An x-ray generator comprising:

a vessel for holding a low pressure gas atmosphere inside;

hemimorphic crystal supporting means arranged in said vessel;

a pair of hemimorphic crystal aggregates supported by said hemimorphic crystal supporting means in said vessel and arranged oppositely to each other at a distance therebetween;

a heating and cooling means for elevating and lowering a temperature of said hemimorphic crystal aggregates;

said pair of hemimorphic crystal aggregates being respectively composed of a number of hemimorphic crystals supported on a base and concavely curved, all of the hemimorphic crystals constituting one of said hemimorphic crystal aggregates facing positively charged planes toward a side apart from said base, all of the hemimorphic crystals constituting the other of said hemimorphic crystal aggregates facing negatively charged planes toward the side apart from said base, said pair of hemimorphic crystal aggregates being arranged oppositely to each other at a concave side apart from said base thereof; and

a metal target arranged between said pair of hemimorphic crystal aggregates and supported by a target supporting means in said vessel.

Claim 31 : (New) The x-ray generator according to claim 30, wherein said vessel has walls formed of a material for blocking x-ray transmission and provided with at least one slit-shaped x-ray transmission window positioned in a same plane, and wherein said base has a semi-cylindrical form, and wherein said hemimorphic crystals are arranged on the concave side of said base, and said pair of hemimorphic crystal aggregates are arranged oppositely to each other in said vessel in such a manner that a space between the aggregates in an axial direction matches said at least one slit-shaped x-ray transmission window.

Claim 32 : (New) An x-ray generator, comprising:

a vessel for holding a low pressure gas atmosphere inside, said vessel being formed of a material for blocking x-ray transmission;

hemimorphic crystal supporting means arranged in said vessel;

a pair of hemimorphic crystal aggregates arranged oppositely and joined to each other through a dielectric material, and supported by said hemimorphic crystal supporting means in said vessel;

a heating and cooling means for elevating and lowering a temperature of said hemimorphic crystal aggregates;

said pair of hemimorphic crystal aggregates being respectively composed of a number of hemimorphic crystals supported on a concave side of hemispherical shell-shaped bases, all of the hemimorphic crystals constituting one of the hemimorphic crystal aggregates facing positively charged planes toward a side apart from said base, all of the hemimorphic crystals constituting the other of said hemimorphic crystal aggregates facing negatively charged planes toward the side apart from said base, said pair of hemimorphic crystal aggregates being arranged oppositely to each other at the concave side apart from said base thereof and joined to each other through a ring-shaped dielectric material so as to form a spherical shell; and

a metal target supported by a target supporting means in said spherical shell at a position including a center of said spherical shell, at least one of said pair of hemimorphic crystal aggregates being provided with at least one through hole, a wall of said vessel being provided with an x-ray transmission window aligning with said at least one through hole.

Claim 33 : (New) An ozone generator, comprising:

a low pressure gas sealing housing;

a hemimorphic crystal arranged in said housing;

a heating and cooling means for repeatedly heating and cooling said hemimorphic crystal arranged in said housing; and

a vessel for a material gas for generating ozone, said vessel being arranged adjacently to an outside or inside of said housing, said vessel for the material gas for generating ozone being irradiated with soft x-rays generated from said hemimorphic crystal through an x-ray transmission window.

Claim 34 : (New) The ozone generator according to claim 33, wherein an x-ray target is arranged in the low pressure gas sealing housing, and wherein the soft x-rays and charged particle beams generated from the hemimorphic crystal are projected to said x-ray target, and thereby, said vessel for the material gas for generating ozone is irradiated with secondary x-rays generated from the target.

Claim 35 : (New) The ozone generator according to claim 33, wherein a hollow cathode is arranged around the hemimorphic crystal.

Claim 36 : (New) The ozone generator according to claim 33, wherein at least two hemimorphic crystals are arranged oppositely to each other at a space therebetween in said low pressure gas sealing housing, and wherein the heating and cooling means is provided to each of said hemimorphic crystals, and wherein a ring-shaped ozonization chamber is arranged at a side of the space between said hemimorphic crystals opposed to each other, whereby the respective hemimorphic crystals are periodically and thermally excited in a same phase or in opposite phases.

Claim 37 : (New) The ozone generator according to claim 33, wherein a number of hemimorphic crystals are arranged along an arched surface, and an ozonization chamber is arranged at a center portion of said arched surface.

Claim 38 : (New) An ozone generation method, comprising the steps of: arranging a hemimorphic crystal in a low pressure gas sealing housing, and repeatedly thermally exciting said hemimorphic crystal in a cycle of a predetermined period of time, and thereby, continuously generating soft x-rays from said hemimorphic crystal, and generating ozone by irradiating a material gas for generating ozone with the x-rays.

Claim 39 : (New) An ozone generation method, comprising the steps of: arranging and thermally exciting a hemimorphic crystal in a sealed low pressure gas housing, and thereby, inducing an intensive electric field so as to generate and project charged particles and x-rays from said hemimorphic crystal to an x-ray target, and then, irradiating a material gas for generating ozone with secondary x-rays excited on said target, so as to generate ozone.

Claim 40 : (New) The ozone generation method according to claim 38, and arranging a number of hemimorphic crystals oppositely to each other, and controlling thermal excitation cycles of the respective crystals so as to be in a same phase or in opposite phases.

Claim 41 : (New) The ozone generation method according to claim 39, and arranging a number of hemimorphic crystals oppositely to each other, and controlling thermal excitation cycles of the respective crystals so as to be in a same phase or in opposite phases.